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| APPLICATION NO.   | FILING DATE | FIRST NAMED INVENTOR | ATTORNEY DOCKET NO.                  | CONFIRMATION NO. |
|---|-------------|----------------------|--------------------------------------|------------------|
| 09/992,004  | 11/26/2001  | Richard K. Lyon      | 839-1101                             | 5867             |
| 7590  | 12/12/2003  |                      |                                      |                  |
| NIXON & VANDERHYE P.C.<br>8th Floor<br>1100 North Glebe Rd.<br>Arlington, VA 22201-4714 |             |                      | EXAMINER<br>MEDINA SANABRIA, MARIBEL |                  |
|   |             |                      | ART UNIT                             | PAPER NUMBER     |
|   |             |                      | 1754                                 |                  |

DATE MAILED: 12/12/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

|                              |                        |  |                     |  |
|------------------------------|------------------------|--|---------------------|--|
| <b>Office Action Summary</b> | <b>Application No.</b> |  | <b>Applicant(s)</b> |  |
|                              | 09/992,004             |  | LYON, RICHARD K.    |  |
|                              | <b>Examiner</b>        |  | <b>Art Unit</b>     |  |
|                              | Maribel Medina         |  | 1754                |  |

**-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --**

**Period for Reply**

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

**Status**

1) ☒ Responsive to communication(s) filed on 26 November 2001.

2a) ☐ This action is **FINAL**.                      2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

**Disposition of Claims**

4) ☒ Claim(s) 1-6 is/are pending in the application.

4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.

5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.

6) ☒ Claim(s) 1-6 is/are rejected.

7) ☐ Claim(s) \_\_\_\_\_ is/are objected to.

8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

**Application Papers**

9) ☐ The specification is objected to by the Examiner.

10) ☐ The drawing(s) filed on \_\_\_\_\_ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☒ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

**Priority under 35 U.S.C. §§ 119 and 120**

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a) ☐ All   b) ☐ Some \*   c) ☐ None of:

1. ☐ Certified copies of the priority documents have been received.

2. ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.

3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

\* See the attached detailed Office action for a list of the certified copies not received.

13) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application) since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

a) ☐ The translation of the foreign language provisional application has been received.

14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121 since a specific reference was included in the first sentence of the specification or in an Application Data Sheet. 37 CFR 1.78.

**Attachment(s)**

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) \_\_\_\_\_

4) ☐ Interview Summary (PTO-413) Paper No(s). \_\_\_\_\_

5) ☐ Notice of Informal Patent Application (PTO-152)

6) ☐ Other:

### **DETAILED ACTION**

#### **Oath/Declaration**

1. The oath or declaration is defective. A new oath or declaration in compliance with 37 CFR 1.67(a) identifying this application by application number and filing date is required. See MPEP §§ 602.01 and 602.02.

The oath or declaration is defective because:

It does not identify the mailing address of each inventor. A mailing address is an address at which an inventor customarily receives his or her mail and may be either a home or business address. The mailing address should include the ZIP Code designation. The mailing address may be provided in an application data sheet or a supplemental oath or declaration. See 37 CFR 1.63(c) and 37 CFR 1.76.

It does not identify the city and either state or foreign country of residence of each inventor. The residence information may be provided on either on an application data sheet or supplemental oath or declaration.

It does not include the notary's seal and venue.

It does not include the notary's signature, or the notary's signature is in the wrong place.

#### **Claim Objections**

2. Claim 3 is objected to because of the following informalities: after "NiO" a comma should be inserted. Appropriate correction is required.
3. Claim 2 is objected to under 37 CFR 1.75(c), as being of improper dependent form for failing to further limit the subject matter of a previous claim. Applicant is required to cancel the claim(s), or amend the claim(s) to place the claim(s) in proper dependent form, or rewrite the claim(s) in independent form. Claim 2 reads in a limitation recited in claim 1.

#### **Claim Rejections - 35 USC § 112**

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claims 1-6 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

a. Claim 1 is indefinite for use of improper Markush language. The phrase that reads (see lines 11-12) "catalyst chosen from the group of nickel-based reforming catalysts and noble metal based reforming catalysts" is confusing and renders the claim indefinite. The phrase should be changed to -- catalyst selected [chosen] from the group consisting of nickel-based reforming catalysts and noble metal based reforming catalysts--.

b. Claim 1 recites the limitation "the sulfur" in line 13. There is insufficient antecedent basis for this limitation in the claim.

c. Claim 1 is indefinite for use of improper Markush language. The phrase that reads (see lines 14-17) "metal-based catalyst chosen from the group of NiO, Fe<sub>2</sub>O<sub>3</sub>, MnO, CuO, CoO, CdO and ZnO and mixtures thereof, and Fe<sub>2</sub>O<sub>3</sub>, MnO, CuO, CoO, CdO and ZnO and mixtures thereof supported on an inert carrier catalyst" is confusing and renders the claim indefinite. The phrase should be changed to --metal-based catalyst selected [chosen] from the group consisting of NiO, Fe<sub>2</sub>O<sub>3</sub>, MnO, CuO, CoO, CdO, [and] ZnO and mixtures thereof, and Fe<sub>2</sub>O<sub>3</sub>, MnO, CuO, CoO, CdO, [and] ZnO and mixtures thereof supported on an inert carrier catalyst--.

d. Claim 1 recites the limitation "the switching" in line 21. There is insufficient antecedent basis for this limitation in the claim.

e. Claim 1 recites the limitation "the reforming and regenerating modes" in lines 21-22. There is insufficient antecedent basis for this limitation in the claim.

- f. Claim 1 recites the limitation "the heat consumed" in lines 22-23. There is insufficient antecedent basis for this limitation in the claim.
- g. Claim 3 is indefinite for use of improper Markush language. The phrase that reads "the sulfur capture catalyst is chosen from the group, NiO MnO, CuO, CoO, CdO and ZnO" is confusing and renders the claim indefinite. The phrase should be changed to -- "the sulfur capture catalyst is [chosen] selected from the group[,], consisting of NiO, MnO, CuO, CoO, CdO and ZnO" --.
- h. Claim 3 recites the limitation "the sulfur capture catalysts". There is insufficient antecedent basis for this limitation in the claim.
- i. Claim 5 recite the limitations "the vitiated air produced" and "said vitiated air". There is insufficient antecedent basis for these limitations in the claim.
- j. In claim 6, the limitation that reads "and used to generate power via a gas turbine" renders the claim unclear and confusing. It is not clear what is being used to "generate power". Is it the actual  $\text{CaCO}_3$  bed or a product from the reaction taken place in the bed?

**Allowable Subject Matter**

- 6. Claims 1-6 would be allowable if rewritten or amended to overcome the rejection(s) under 35 U.S.C. 112, second paragraph, set forth in this Office action.
- 7. The following is a statement of reasons for the indication of allowable subject matter: Claims 1-6 disclose allowable subject matter. The prior art fails to disclose or suggest the instantly claimed method, wherein a sour gas containing at least 0.1 moles of hydrogen sulfide per mole of methane is reformed in the presence of steam by passing the steam and sour natural gas over a catalyst chosen from a nickel, platinum-based steam reforming catalyst and through a

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metal-based catalyst to capture sulfur and a metal sulfide, and regenerating the metal-based catalyst by contacting the metal sulfide formed during the reforming step with air wherein heat consumed in the reforming step is balanced by heat liberated in the regeneration step.

**Conclusion**


8. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. US 4,539,310 discloses a steam reforming catalysts and process, wherein the hydrocarbon stream being reformed comprises hydrogen sulfide.

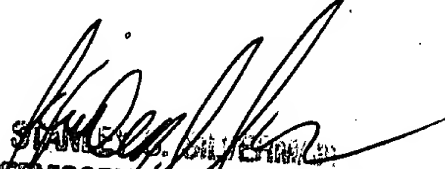
9. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Maribel Medina whose telephone number is (571) 272-1355.

The examiner can normally be reached on Monday through Friday from 7:30 AM to 4:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stanley Silverman can be reached on (571) 272-1358. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-0994.

Maribel Medina   
Examiner  
Art Unit 1754

  
STANLEY L. SILVERMAN  
SUPERVISORY PATENT EXAMINER  
TECHNOLOGY CENTER 1700